Centennial of Flight

By Joanne Hale

(Top) The Wright Brothers' first motor-powered flight at Kitty Hawk, N.C.

Here is a 1953 photo of some of the research aircraft at the NACA High-Speed Flight Research Station (now known as the Dryden Flight Research Center). The photo shows the X-3 (center); clockwise from left are the X-1A, the third D-558-1, XF-92A, X-5, D-558-2 and X-4.

Pilot Bill Dana looks up as the B-52 'mothership' cruises over NASA's HL-10 'lifting' body on Muroc Dry Lake, Calif., in 1969. Lifting bodies are wingless vehicles that fly because of the lift generated by the aircraft's body. The research proved that future spacecraft could land like an airplane, helping to pave the way for the development of the Space Shuttle.

Photo Credit: NASA/Dryden Flight Research Center

These two pages provide a brief look at NASA's significant contributions to the advancement of flight over the past 100 years. The information was compiled from the recent NASA publication Celebrating a Century of Flight.

In the publication, NASA Administrator Sean O'Keefe wrote, "NASA's Vision for the next century of flight – to improve life here, extend life to there, and find life beyond – compels us to improve and create all types of aircraft, better understand Earth's climate, probe the universe's mysteries, and send explorers to the planets. This celebration of the Centennial of Flight reminds all of us how privileged we are to be engaged at just the start of an adventure without end."

To read more in-depth about NASA's involvement in the past 100 years of flight in the Celebrating a Century of Flight *publication, please visit* http://history.nasa.gov/SP-09-511.pdf.

The Wright Brothers: Success!

The great moment arrived on the windy winter morning of Dec. 17, 1903, on a North Carolina beach, the result of the work of two brothers with a passion for bicycling and an insatiable curiosity.

Orville Wright made the first flight at about 10:35 a.m. – a bumpy and erratic 12 seconds in the air. The Wright brothers introduced the era of powered flight, and men and women everywhere were anxious to follow them into the air. Steady improvements in the design of engines and aircraft structures produced a new generation of aircraft capable of flying higher, faster and farther.

NACA: A Tradition of Excellence

Spurred by the beginning of World War I and a heightened interest in aviation research, the U.S. Congress created the National Advisory Committee for Aeronautics (NACA) in 1915. In its early days, NACA concentrated on problems related to military aviation. When the war ended, however, the engineers of the newly constructed Langley Memorial Aeronautical Laboratory in Hampton, Va., turned their attention to the solution of a broad range of problems in flight technology.

During the 1920s and 1930s, NACA engineers built a reputation for excellence in research and achieved a host of critical breakthroughs resulting in increased performance. The NACA contributed to victory in World War II and pioneered the postwar research that transformed the airplane into a high-speed, high-altitude aerospace vehicle.

NACA would expand to encompass three research centers: Langley, Ames Research Center in California and Lewis Research Center in Ohio. By 1958, these centers would employ more than 8,000 people with a budget of more than $117 million. The NACA centers would contribute to the development or improvement of every American aircraft produced during this time.

NACA engineers and scientists were responsible for the basic and applied research that led to the development of aircraft structures, safety, fluid dynamics, aerodynamics, ground test facilities, flight testing and high-speed flight from theory to practice. NACA made advancements and contributions in every field associated with aeronautics and the fledgling field of spaceflight.

Higher and Faster

After the first successful supersonic flight in 1947 by Air Force Test Pilot Captain Chuck Yeager, several milestones were accomplished by research pilots flying aircraft designed to test the boundaries of speed and altitude. Later, the Navy and NACA developed the D-558, which first flew Mach 2 on Nov. 30, 1953. Research on the Bell X-2 of the mid-1950s resulted in advanced materials for high-speed aircraft such as the XB-70 bomber, the SR-71 spy plane and the Space Shuttle.

Dawn of the Space Age

The National Aeronautics and Space Administration (NASA) was formed with President Dwight D. Eisenhower's signing of the National Aeronautics and Space Act of 1958. The NACA and parts of other agencies formed its core; its purpose was research and development for the exploration of space.

Beginning in the early 1960s, NASA partnered with the Air Force and other organizations and developed and flew a series of prototypes of future spacecraft that could land like an airplane after reentering the atmosphere – as the Space Shuttle does today.

To the Moon: Apollo

As an effort to offset world perception of Soviet leadership in space and technology, Pres. John F. Kennedy made a public commitment on May 25, 1961, to land an American on the Moon by the end of the decade. Apollo 11 made the epic voyage. On July 20, 1969, the Lunar Module, with Astronauts Neil A. Armstrong and Buzz Aldrin aboard, landed on the lunar surface while Michael Collins orbited overhead in the Apollo Command Module. These astronauts were the first humans ever to reach another world.

A CENTURY OF ACHIEVEMENT

The Apollo program left several important legacies: It accomplished its political goals; it was a triumph of enormously difficult systems engineering and technological integration; it provided lunar samples for decades of scientific research; and it enabled the people of Earth, for the first time, to see their home from afar – a tiny, lovely and fragile "blue marble" hanging in the blackness of space.

Flying to and from Earth orbit: The Space Shuttle Launch Systems

As the Apollo missions came to a close, NASA's major effort in human spaceflight involved the development of a reusable Space Shuttle that could travel back and forth between Earth and space more routinely and economically than had ever been done before. On April 12, 1981, the first operational orbiter, *Columbia*, was launched from the Kennedy Space Center in Florida.

In the beginning of the 21st Century, the Space Shuttle is still the only vehicle in the world with the capability to deliver and return large payloads to and from orbit. Since 1981, the Space Shuttle has launched 113 times and remains one of the most impressive technologies in American history.

Space Stations past and present

Space exploration enthusiasts have long believed that a permanently occupied space station was a necessary outpost in the new frontier of space. NASA deferred this project during Project Apollo, but on May 14, 1973, it launched a small orbital space platform called Skylab. During 1973, Skylab became home to three crews, who conducted experiments on solar astronomy, Earth resources and medical studies. At the conclusion of Skylab 4, the orbital workshop was powered down and allowed to burn up on reentry in 1979. Skylab served as a predecessor for a full-fledged space station.

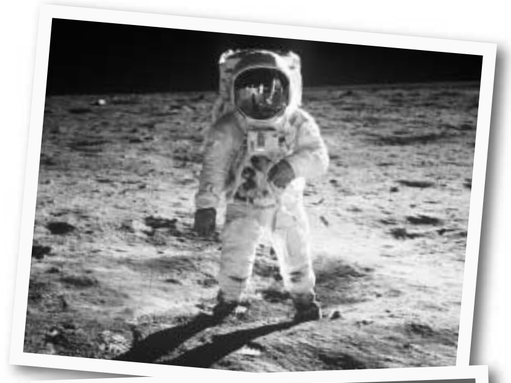
In 1984, the development of a new, permanently occupied space station was begun. The United States joined with 15 other nations to create this research outpost. In December 1998, the first elements of the International Space Station were assembled in orbit. A succession of missions has since continued the construction.

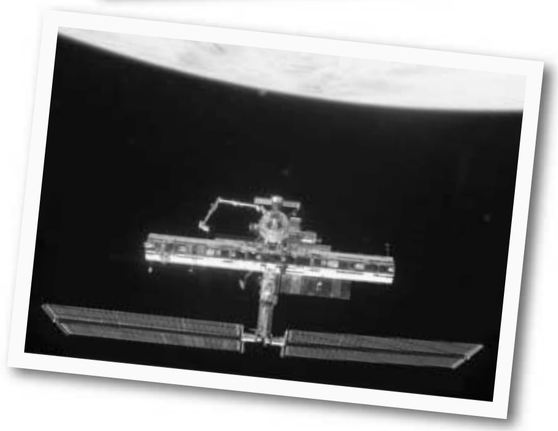
The Future of Flight

Working with airlines and industry leaders, NASA is developing new technologies that will bring about improved safety and larger aircraft that transport more passengers using less fuel. New systems and tools for pilots and air traffic controllers will enable airlines to increase the number of flights while dramatically decreasing delays. Business and personal travel could benefit from this change with more choices and lower fares. Improvements to systems that support small and personal aircraft could lead to a future in which personal planes are used much like today's automobiles.

Future Launch Systems

In the early days of flight in the 20th Century, the U.S. government fostered aviation. As the nation marks the 100th anniversary of powered flight, NASA is continuing this historic tradition with an investment in the development of future launch systems. This will ultimately help move the nation from the pioneering era of the Mercury, Gemini, Apollo and Space Shuttle programs to a future in which people are more routinely traveling, working and living in space.





(Top) Astronaut Edwin E. Aldrin, Jr., lunar module Pilot, walks on the surface of the Moon near the leg of the Lunar Module (LM) 'Eagle' during the Apollo 11 spacewalk. Astronaut Neil A. Armstrong, Commander, took this photograph with a 70mm lunar surface camera. While Astronauts Armstrong and Aldrin descended in the LM to explore the Sea of Tranquility region of the Moon, Astronaut Michael Collins, command module Pilot, remained with the Command and Service Modules in lunar orbit.

Space Shuttle *Atlantis* leaps from the steam and smoke billowing across launch pad 39B after liftoff at 3:46 p.m. EDT at Kennedy Space Center on mission STS-112.

On Oct. 31, 2000, the first crew left Earth to set up residence aboard the International Space Station; and with this accomplishment, the spacefaring nations of the world intend that no future generation will ever know a time when there is not some human presence in space. The Space Station promises to become the anchor tenant of a research park in space, contributing critical knowledge necessary to make life on Earth more rewarding and to aid humanity's movement beyond this planet.